Strategic Response to Mandatory Price Reporting Legislation; An Alternative Consideration

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> It is imperative that we use *stylized facts* in economic analysis. There simply is not enough information to adequately portray reality. Even if there were, its use would neither be possible nor practical. The computational power required to analyze the details of reality is far beyond even our imagination. Furthermore, detailed specification of a particular situation decreases the number of stakeholders to whom it is relevant. By incorporating the very details that make our work relevant, we lose our audience.
>
> Paraphrased from a microeconomics lecture
> University of Minnesota, Spring 1985

INTRODUCTION

In the world of textbook neoclassic economics, consumer demand is passed back through the marketing channel. In this perfect market, producers know what consumers are willing to pay for product attributes and combinations thereof. Producers then respond accordingly in allocating resources in productive activities. In our market, as in all, this process is constrained by imperfect information and risk. In agriculture, and particularly in the livestock industry, substantial time lags between decision making in production and the results for consumers also limit responsiveness to market signals.

The Livestock Mandatory Reporting Act of 1999. Recent public and legislative attention to the lack of market information available to livestock producers, and strong margins in the hog packing sector, have helped fuel the approval of the Livestock Mandatory Reporting Act of 1999. In 1988, prices of commercial hogs were at their lowest since 1972 and, when adjusted for inflation, were at their lowest level of this century (Gants, 1999). Retail prices did not decline accordingly, resulting in a farm-to-retail price spread large enough to prompt seven senators, led by Tom Harkin (D-Iowa), to urge Secretary Glickman to investigate. The senators argued that "Enough evidence exists to raise strong suspicions that more than just the invisible hand is at work" (Gants, 1999). Alternatively, those in opposition to the legislation pointed to evidence that suggests that the farm-to-retail price spread was simply a result of fully utilized capacity in the packing industry. Packers reached capacity and in fact set a weekly slaughter record during 1998. During fourteen weeks of 1998, over two million hogs were slaughtered by U.S. packers. Operating beyond planned capacity increases packer operating costs. For

example, Cattle Buyers weekly reported that IBP pork packing plants paid almost twice as much overtime in 1998 as in 1997 (Gants, 1999).

From the debate emerged the Livestock Mandatory Reporting Act, signed by President Clinton as part of the fiscal year 2000 Agricultural Appropriation bill. At the time of this writing, public comment is being accepted on the proposed associated rules. As proposed, rules require federally inspected pork, cattle and sheep packers that slaughter more than 100,000 hogs, 125,000 head of cattle, or 75,000 lambs annually to report on transactions either three times (swine) or twice (cattle, lambs and boxed beef cuts) daily. Reporting requirements include prices paid and the associated marketing arrangements under which livestock and meat were traded (including, for example, details regarding adjustments for livestock purchased on carcass merit). Other marketing arrangements such as those based on forward contracting and formula pricing for cattle, packer owned cattle and lamb, and negotiated livestock purchases are included. Proposed rules also require sales and purchases of lamb carcasses and boxed lamb cuts be reported daily and purchases of imported lamb carcasses and sales and purchases of imported lamb cuts be reported weekly.

Legislative Objectives. The goal of the mandatory reporting legislation is to increase market transparency in livestock and meat sales. Justification for this legislation has focused largely on the anticipated results for livestock producers, namely increased information for decision making in production and marketing. A 14 March 2000 announcement of the proposed rules included the following comments by Secretary Glickman:

> "We need to ensure that small farmers and ranchers have a full and fair opportunity to compete in an increasingly concentrated agricultural economy. This new mandatory price reporting program will help producers by making the market more transparent, giving them better information about what's happening in the marketplace."
>
> (http://www.usda.gov/news/releases/2000/03/0081)

The literature and much of the public comment received on the proposed rules at the time of this writing concur with the need for price transparency in the livestock and meat industry to facilitate efforts by market participants to make efficient marketing decisions (for example, see Lawrence et al., 1996; Ward, 1988 and public comment from American Farm Bureau Federation and Livestock Marketing Association at http://www.ams.usda.gov/lsg/mpr/). There is also widespread (albeit incomplete) agreement that the current system in place does not provide the necessary level of price transparency. The USDA estimates that under the current voluntary price reporting system implemented by the Agricultural Marketing Service (AMS), 35 to 40 percent of cattle, 75 percent of hog and 40 percent of lamb transactions are not being reported. Furthermore, little price information is reported on the significant and increasing number of animals are being sold under a prearranged marketing arrangement and by forward contract or ownership, further thinning markets used as the basis for public price information.

In addition to providing participants better information by which to make production and marketing decisions, proponents of the mandatory reporting legislation argue that increased market transparency will encourage competition in livestock and meat markets. This speaks to the long held concern, particularly by the U.S. beef industry, about the level of packer concentration. Today, the top four firms (CR-4) purchase approximately 80 percent of fed cattle, 55 percent of fed hogs and 80 percent of fed lambs (USDA, 2000).

Precursor State Legislation. The federal Livestock Mandatory Reporting Act follows in the footsteps of and preempts similar legislation by five states: Iowa, Minnesota, Missouri, Nebraska and South Dakota (although only Minnesota and South Dakota have collected mandated market information). There was intense debate regarding state legislation, most recently over the impact of legislation in Missouri on cash market purchases by packers. Valid concerns exist when states independently impose requirements on firms operating within, or with participants in, their state. Influenced are the relative informational and cost advantages of firms within versus outside the state. Wilson, Dahl, and Johnson (1999) demonstrate that less transparent firms (for example, packers in states without mandatory price reporting) have an advantage over their more transparent rivals in bidding. In addition to resulting informational asymmetries, state mandatory reporting requirements impose an operational cost on a firm not faced by their rivals in other states. This issue, well explored for various industries and a multitude of issues ranging from environmental restrictions on agricultural production to term limits for our nation's legislators is important. However, under the new federal legislation it becomes mute except as it is extended to consideration of the impact of mandatory reporting on the competitive position of firms in the United States relative to rival firms across their borders. This is discussed in the final section of this paper.

Influence on the Competitive Position and Strategic Behavior of the Packing Industry. In spite of the publicity during the writing of the Livestock Mandatory Reporting Act, little public attention has been paid to its real or potential disadvantages. Two such disadvantages are worthy of note here. The first was well debated during the initial implementation of legislation requiring packers and processors to implement a Hazard Analysis Critical Control Point (HACCP) program. As it relates to the Livestock Mandatory Reporting Act, it is well articulated in a letter written by Jay Bonahoom, general manager of a lamb packing and processing plant (Wolverine Packing) in response to the USDA's call for public comment on the proposed rules. That is, that the requirements may impose an unnecessary administrative (cost) burden on affected businesses, particularly small firms and those buying and/or selling a wide line of products. Consideration of administrative burdens associated with implementing requirements of the Livestock Mandatory Reporting Act, while important, is outside the scope of this paper.

A second potential effect of the Livestock Mandatory Reporting Act not yet well explored is the influence the resulting price transparency may have on the strategic behavior of firms in the concentrated packing sector in the United States. The literature demonstrates that transparency within an industry can result in a less, not more, competitive market. For example, in an analysis of international wheat trade, Wilson et al. (1999) found that increased uncertainty about rival firms increased equilibrium bids to, and thus payoffs for, sellers. In other words,

uncertainty between rival bidders was advantageous to those from whom they were buying. It is appropriate that the same careful analysis be applied to the livestock and meat industries. Thus, the purpose of this paper is to identify and consider alternative strategic responses by the U.S. packing industry to the information and market transparency provided as a result of mandatory price reporting. In particular, conditions influencing the likelihood of cooperative bidding on livestock by participating packers will be considered. A review of economic models useful for predicting strategic response of rival firms will precede consideration of the influence of market structure on the sustainability of cooperative bidding strategies and application of such to the meat packing industry. The paper concludes with a discussion of as yet unanswered questions about the impact of mandated market transparency on rival firm behavior.

BIDDING RIVALRY

The literature on game theory identifies competitive strategies that are applicable in concentrated industries and when bidding is repeated over many periods such is the case in the U.S. packing industry. Many of these strategies are appropriate only when it is possible for firms to know or make a reasonable estimate of the bids of rival firms. If effectively enforced, mandatory price reporting may result in the necessary price transparency for these strategies to be effectively employed.

The research question to be addressed in this paper is whether cooperative bidding is a likely outcome for firms in the U.S. packing industry faced with mandatory price reporting. Simplified, there are two alternatives for a firm required to report prices, compliance or noncompliance. The decision for a firm is influenced by the likely benefits to be derived from full and accurate price reporting and the likelihood and cost of being discovered engaging in less than full or accurate disclosure. For purposes of this discussion, it is assumed that the proposed $10,000 fine per noncompliance violation is adequate to ensure firms are timely, accurate and complete in reporting market transactions.

Strategic Bidding. Whether to engage in cooperative bidding with rival firms is a strategic choice for individual firms. Bidding competition and the potential for coordination are influenced by market structure and the accuracy, completeness and timeliness of industry information. Market competition and coordination are here considered using economic models, models which “reduce a complicated phenomenon - industry rivalry - to an analytically convenient form” (Besanko et al., 1996, p. 355).

Within a static framework, a number of economic models are appropriate and will lead investigators to similar conclusions. For example, Bertrand and Cournot models allow for investigation of firm price and quantity decision making, respectively, within a competitive market. Similarly, the use of a game theory model commonly known as prisoners’ dilemma allows for prediction of a competitive solution between rivals within a static (one period) framework. Consider the following example of a two packer market.

	Firm 1		
Firm 2		High Bid	Low Bid
	High Bid	1 (High, High) A 2 (High, High)	1 (Low, High) C 2 (Low, High)
	Low Bid	1 (High, Low) B 2 (High, Low)	1 (Low, Low) D 2 (Low, Low)

The choice variable for each firm is bid price (high or low). i indicates the payoff for each firm under each choice given the choice of their rival. In the context of this game, the high bid strictly dominates the low bid for each firm (a nash equilibrium). For example, the payoff to Firm 1 (1) when choosing a high bid is greater than when choosing a low bid regardless of the bidding strategy of Firm 2 (the same is true for Firm 2). In a static framework, both firms will therefore choose the high bid price, the competitive outcome (A) and that no doubt preferred by producers selling to the packer firms. While both firms would be better off under the cooperative solution (D), within a static framework there is no incentive to cooperate because there is little or no means to ensure rival firm(s) will also choose the cooperative solution. Each firm chooses the competitive solution because they are better off than if they were to cooperate but their rival(s) did not.

Although the static framework is a convenient means by which to evaluate bidding decisions and can incorporate a variety of factors likely to influence firm strategy, it does not explain why, in some concentrated industries, firms can maintain levels of profit above the competitive equilibrium without formal collusion and in other industries they cannot. This can be explained, however, using dynamic game theory which incorporates the effects of firm decision making in one period on firm and rival behavior in subsequent periods. In essence, dynamic game theory allows the long term benefits and costs associated with a particular strategy to be explicitly considered in decision making. As such, the use of a dynamic (repeated game) model changes the payoffs associated with certain behaviors when compared with a static model. It also changes how factors such as the uncertainty of, and cost associated with, the failure by other firms to engage in cooperative bidding are considered.

A dynamic game theory framework can be used to estimate firm behavior under a variety of conditions. In the case of mandatory price reporting, two decisions of note are bidding strategy and compliance. The former is considered here through qualitative assessment of the impact of various components of the structure of the livestock industry on the likelihood of a cooperative (versus competitive) bidding outcome.

Cooperative Bidding. Under certain firm and market conditions it may be in the best interest of firms within an industry to behave cooperatively so that industry selling price is above, or purchasing price is below, the competitive equilibrium. The folk theorem demonstrates that, for sufficiently low discount rates, any price between the monopsony and competitive bid prices can be sustained by buyers in equilibrium in a market in which choices are repeated over a number of periods. While a number of literary resources provide mathematical proofs supporting this outcome under various conditions[1], it suffices to summarize the idea as follows: if a buying firm is better of with their share of monopsony profits over a specific or infinite time horizon than with the benefit of a one period noncooperative bidding strategy, they have the incentive to coordinate bidding with industry rivals.

To reach an outcome of coordinated bidding in the packing industry, conditions must be such that it is in each firm's own best self interest. Coordination can take the form of a collusive agreement or other, non-collusive cooperation. While the easiest form of coordination in many circumstances, use of collusive agreement for bidding is illegal in most economies, including our own. There are however many legal forms of cooperative bidding[2]. For example, under the Grim Trigger Strategy, a firm announces or signals to other firms that it will maintain a certain bid strategy unless a rival firm bids higher at which time the firm will return to competitive bidding forever. In this case, the price leader maintains industry discipline by threat of an infinitely long price war. In another strategy, Tit for Tat, a firm signals or announces that it will match the bids of its rivals (e.g. by announcing "we will not be underbid"). This strategy is more robust in that it is simple, and easy to describe and understand. As such, the strategy is easier to signal to rivals. In a Tit for Tat strategy, the price leader is never the first to deviate from the cooperative strategy, and immediately punishes a deviator upon detection, but is quick to forgive the deviator if they return to cooperative pricing.

Sustainability of Cooperative Bidding. The success of the Tit for Tat and other cooperative strategies depends on the presence of a clear focal point on which to cooperate. It must be a "strategy so compelling that it would be natural for a firm to expect all other firms to adopt it" (Besanko et al., 1996, p. 361). There are a number of structural factors which affect an industry's ability to identify a clear focal point and therefore which influence the likelihood of sustainable cooperative pricing. They include market concentration, the speed at which firms can detect and react to the behavior of rivals, symmetry between rival firms, and the degree of multi-market contact between firms. The relevance of each to the livestock industry, particularly as it relates to competitive bidding for livestock and the implications for potential strategic behavior under the Livestock Mandatory Reporting Act are discussed.

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[1] See, for example, Besanko et al. (1996).

[2] Throughout much of the literature, cooperative agreements are discussed in the context of firms which compete in the output market. In this paper, the likelihood of cooperative bidding among packers on an input, livestock, is discussed. Caution is therefore advised when comparing the content and findings of this paper with other literature on the subject.

Market Concentration

As evidenced by antitrust policy in the United States, all else equal, sustainable cooperative bidding is more likely in a concentrated industry[3]. Industry concentration facilitates bidding coordination in several ways. First, because the market share of a firm is larger in a concentrated industry, firms gain less from noncooperative pricing in efforts to acquire market share of rival firms. Coordination may also be easier in an industry with fewer firms because rivals are more likely to be identifiable. This is particularly true when there is a stable pattern of decision making and behavior within the industry. The intent of fewer and more well known firms is easier to interpret (for example, a price leadership strategy would be more evident to rival firms). Bid price discipline is also facilitated when the behavior of specific rivals can be identified relatively easily. In more concentrated industries it is, in general, easier for firms to identify and punish rival firms that deviated from the cooperative strategy.

Detection of and Reaction to Rival Behavior

Cooperative bidding is more likely when there are relatively short time lags between the detection of, and ability to react to, noncooperative bidding by rivals. The speed at which firms can detect and react to noncooperative bidding by rivals may be facilitated by mandatory price reporting in the livestock industry. Specifically, the frequent interaction of firms in the packing industry does, and the proposed functioning of the Livestock Mandatory Reporting Act will, increase the speed at which noncooperative bidding can be detected (through price transparency) and reacted to (because of the short lag between market transactions). As described in the previous section, industry concentration facilitates detection of rival firm behavior.

Detection and reaction speed (and thus sustainability of cooperative pricing) are also influenced by the nature of transactions, information availability, and the volatility of industry demand. The more infrequent is industry bidding, the more intense is competition among competing firms. Not only does bidding approach continuous in the livestock industry but mandatory price reporting will make information about such timely so that, if identifiable, firms engaging in noncooperative bidding could be quickly punished. However, if implementation of the Livestock Mandatory Reporting Act successfully protects the confidentiality of individual packers, it may continue to be difficult to identify (and punish) firms which engage in noncooperative bidding.

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[3] Besanko et al. (1996) demonstrate that optimal selling firm behavior is cooperative pricing if $\frac{\frac{1}{n}[\Pi^m - \Pi^c]}{\Pi^c - \frac{1}{n}\Pi^m} > i$ where Π^m are monopoly profits, Π^c are competitive profits, n is the number of firms in the industry, and i is the discount rate. A reduction in n (increased industry concentration) increases the benefits (the numerator) and decreases the costs (the denominator) associated with cooperatively pricing.

All else equal, the more information that is available to industry participants about individual transactions (bids), the more sustainable will be cooperative pricing (Wilson et al., 1999). For example, as a result of mandatory price reporting, noncooperative bidding by rivals will be easier to detect and the potential for misreading the behavior of a rival firm less likely. Under the current system of voluntary price reporting, there is generally no information available about internal transactions of livestock (for example the transfer of packer owned livestock). Under mandatory price reporting, firms might employ creative accounting strategies to arrive at the desired reportable bid price for such internal transactions. In the absence of such, however, mandatory price reporting will make noncooperative bidding by rivals easier to detect. Furthermore, the more detailed the market information available, the easier it will be to monitor rival firms and thus sustain cooperative pricing (for example consider the specific terms of trade reporting requirements of the Livestock Mandatory Reporting Act).

Finally, and perhaps most ironic, success by the AMS in providing accurate, timely market information will help industry participants (including packers) define industry demand and therefore separate the effect of changes in industry demand from the effect of rival firms engaging in noncooperative bidding (or "chiseling"). A firm's ability to separate industry from rival induced demand changes is particularly important in the high fixed cost packing industry. In this industry, as in all, the focal point of any cooperative bidding strategy (e.g. monopsony bid price) is a moving target, changing with industry conditions. When marginal costs are low, such as is the case when the industry is operating at low capacity utilization, small changes in industry demand have a relatively large influence on the cooperative bid price.

Other Influencing Factors. Two other characteristics may be important to the sustainability of cooperative pricing in the livestock industry, industry symmetry and multi-market contact between firms. Although neither is considered in detail here, the effect of each may have profound impacts on competitiveness in the livestock industry.

Industry symmetry is important for the sustainability of coordinated pricing strategies. It is difficult for an industry with a great deal of asymmetry between firms to achieve cooperative bidding because it is difficult to identify an industry focal point for coordination. For example, packers with relatively high fixed costs (e.g. with a high degree of automation) will prefer a higher degree of capacity utilization (and thus a higher bid price for livestock) than firms with relatively higher variable costs. Furthermore, firms with a great deal of underutilized capacity (e.g. new or expanding firms) or those who do not consider themselves large enough to be detected or punished for noncooperative behavior have a greater incentive to offer higher bids than rival firms. Another important difference between firms in the livestock industry that will reduce sustainability of coordinated bidding is the value they place on animals of particular types and characteristics. Segmented markets such as is the case, for example, when packers clearly prefer "heavier"or "lighter" animals makes coordination difficult both because it makes industry monitoring difficult and because it reduces industry ability to identify a focal point for coordination.

Finally, multi-market contact between firms is likely to facilitate cooperative pricing because firms must not only consider the effect of noncooperative behavior in the market in question but in other markets as well. This will become increasingly important if individual packers gain market share in more than one livestock market (e.g. beef and pork).

COOPERATIVE BIDDING IN THE LIVESTOCK INDUSTRY – CONCLUDING COMMENTS

Proponents of the Livestock Mandatory Reporting Act argue that increased market transparency will encourage competition in livestock and meat markets. However, market transparency may also facilitate cooperative pricing in the industry. The livestock market has a number of characteristics that make sustainable cooperative bidding more likely and others that reduce its likelihood. It is a concentrated industry with few major participant buyers, firms that are familiar with the characteristics and behaviors of their rivals. Market transactions are frequent and, under mandatory price reporting, information about them would be available within hours. However, the speed at which noncooperative participants could be identified and punished by rival firms would be greatly diminished and in fact detection may be unlikely if confidentiality of participant transactions is maintained as presented in the pending rules. Asymmetry among buying participants in the livestock industry and uncertainty associated with the characteristics and behavior of rival firms will influence and likely damper the ability of the industry to sustain cooperative bidding. Finally, consideration should be paid to the influence of the degree and nature of multi-market contact between rivals in a given market on the likelihood of sustainable coordinated bidding.

UNANSWERED QUESTIONS

As demonstrated within the context of this paper, identifying the strategic options for firms in the packing industry facing federally mandated price reporting includes consideration of a variety of structural and behavioral factors. This paper, therefore, leaves a multitude of questions unanswered. If answered, important information about the impact of mandatory price reporting on the strategic behavior of rival packing firms and on our nation's livestock producers, consumers, and other market participants may be revealed.

Briefly identified here are areas appropriate for further investigation. Included are the need to determine the net value of information to market participants, estimate individual parameters influencing the likelihood of a cooperative (versus competitive) bidding outcome, and consider the influence of operational and informational asymmetries between existing and potential rival firms, the extent to which uncertainty about compliance by rival firms will influence firm behavior, and the impact of the Livestock Mandatory Reporting Act on the competitive position of the U.S. livestock and meat industries in the world market.

Value of Price Transparency. Seemingly, the primary objective of the Livestock Mandatory Reporting Act is to provide market information accessible equally to decision makers within the

industry that is useful to them in decision making. Under-explored is the value of this information to various decision makers throughout the sector, the associated costs of its collection and use, and how the information will alter the existing competitiveness of participants.

The AMS will begin price dissemination on a national basis and will refine it to include regional and perhaps state level information. The degree of detail will be limited by the necessity of maintaining confidentiality of reporting firms. One question that has not been adequately addressed is the value of this aggregate data to producers and other market participants. Daily price information is of value to producers in deciding when to market and where to market livestock only if information captures or can easily be translated to local market conditions. Livestock are not a storable commodity except in the very short term. While accurate and complete pricing information will likely be useful to producers making intermediate and long term decisions such as investment and breeding, these decisions do not require daily market information. If market information is presented in aggregate to ensure confidentiality, consideration must be paid to the degree of timeliness required and its associated cost to market participants. If, for example, three times a day aggregate price updates are not useful in short term decision making and the cost of collecting and disseminating such is great, consideration should be paid to reducing reporting requirements if doing so will not alter the ability of the legislation to meet stated objectives.

Parameters Influencing Strategic Behavior. Another challenge facing policymakers lies in estimation of the parameters influencing the likelihood and extent of a coordinative rather than a competitive bidding outcome. Cost estimates associated with the reduction in capacity utilization that may be required to sustain coordinated bidding may come from the deep body of literature in this area or by collecting such information from existing firms. Bid price alternatives under different supply and demand conditions can then be estimated for individual firms. This information is necessary to accurately estimate optimal firm behavior in the context of alternative strategies by rival firms and the resulting likelihood of cooperative (versus competitive) bidding.

Operational and Informational Asymmetries. The literature has demonstrated that optimal bidding strategies depend on the extent of operational (cost, location, and value placed on inputs of differing characteristics) and informational asymmetries between existing and potential rival firms. The degree to which these asymmetries exist and are known by rival firms need be included in any estimation of strategic behavior by industry firms.

Information Uncertainty. Complete disclosure under mandatory price reporting cannot simply be assumed. As is true with any rule governing firm behavior in a competitive environment, the likelihood of compliance by rival firms will be uncertain. Of value to policy makers for this and other legislation in agricultural industries increasingly typified by concentration are estimates of the degree of compliance necessary to make an industry strategy of cooperative pricing unattractive to participants. Estimates of such can be obtained by solving for optimal firm strategies under alternative assurances rival firms are complying with price reporting

requirements (including completeness and accuracy).

Competitiveness of the U.S. Livestock Industry. Mandatory price reporting legislation was adopted by five, and implemented by two, states prior to passage of the Livestock Mandatory Reporting Act of 1999. Opponents to state legislation tenaciously argued that it would disadvantage packers within the state relative to packers outside of the state. Under the new federal legislation this point becomes mute. However, under federal mandatory price reporting, consideration necessarily shifts to the impact on the competitive position of firms in the United States relative to rivals across their borders.

REFERENCES

Besanko, D., D. Dranove, and M. Shanley. 1996. Economics of Strategy. John Wiley and Sons. New York.

Gants, R. 1999 February. Pork and Profits. Meat and Poultry 45(2), pp.18-20.

Lawrence, J.D., J.A. Shaffer, and M.L. Hayenga. 1996. "Valuing Public Price Reporting: The Iowa Experience." Journal of Agribusiness 14 (1): 15-32.

United States Department of Agriculture. 2000. Livestock Mandatory Reporting Program. http://www.ams.usda.gov/lsg/mpr/.

Ward, C.E. 1987. "Market Structure Dynamics in the Livestock-Meat Subsector: Implications for Pricing and Price Reporting." Key Issues in Livestock Pricing: A Perspective for the 1990's, ed. W. Purcell and J. Rowsell. Blacksburg, VA: Research Institute on Livestock Pricing, pp. 8-54.

Wilson, W.W., B.L. Dahl, and D.D. Johnson. 1999. Transparency and Bidding Competition in International Wheat Trade. Agricultural Economics Report No. 414. North Dakota State University. Fargo, North Dakota.